Amendments to the Claims

1 - 55. (Cancelled)

56. (New) A method of screening for an anti-tumour substance, said method comprising the steps of:

a. providing an in vitro model of a mammalian tissue, said model comprising living mammalian cells of at least two different phenotypes in a predetermined initial proportion, the cells forming 3-dimensional aggregates, each of said aggregates comprising cells of at least a first and a second phenotype, wherein cells of the first phenotype are tumour cells;

b. providing a candidate anti-tumour substance;

c. culturing the cells for a predetermined period of time in the presence and in the absence of the candidate anti-tumour substance;

d. assessing a characteristic of cells of at least one of said phenotypes in the absence and in the presence of the candidate anti-tumour substance; and

e. accepting or rejecting the candidate anti-tumour substance based on results of the assessment in step d.

57. (New) The method according to claim 56, wherein the characteristic is simultaneously assessed in cells of at least two of said phenotypes in step d.

58. (New) The method according to claim 56, wherein assessing said characteristic in step d comprises measuring the rate of cell proliferation.

59. (New) The method according to claim 58, wherein the cells of at least one phenotype are fluorescently labeled.

60. (New) The method according to claim 59, wherein the cells of at least one cell phenotype are fluorescently labeled prior to forming the 3-dimensional aggregates.

61. (New) The method according to claim 58, wherein the cells of at least one phenotype are labeled with a fluorescent membrane linker.

62. (New) The method according to claim 58, further including the step of dispersing the cell aggregates into a suspension of individual cells prior to measuring the rate of cell proliferation.

63. (New) The method according to claim 58, wherein the rate of cell proliferation is expressed as the proliferation index.

64. (New) The method according to claim 63, wherein the proliferation index is calculated from flow cytometry analysis.

65. (New) The method according to claim 56, wherein assessing said characteristic in step d comprises measuring modulation of gap junction intercellular communication.

66. (New) The method according to claim 65, wherein the cells of at least one phenotype are loaded with a fluorescent dye impermeable to the cell membrane.

67. (New) The method according to claim 66, wherein the cells of at least one phenotype are loaded with the fluorescent dye prior to forming the 3-dimensional aggregates.

68. (New) The method according to claim 66, wherein gap junction intercellular communication is measured by measuring migration of the fluorescent dye to cells of at least one other phenotype.

69. (New) The method according to claim 66, wherein the fluorescent dye is calcein-AM.

70. (New) The method according to claim 65, further including the step of dispersing the cell aggregates into a suspension of individual cells prior to measuring modulation of gap junction intercellular communication.

71. (New) The method according to claim 56, wherein assessing said characteristic in step d comprises measuring modulation of apoptosis.

72. (New) The method according to claim 71, wherein the cells of the second phenotype comprise cells treated with a chemical agent prior to forming the 3-dimensional aggregates.

73. (New) The method according to claim 72, wherein the chemical agent is a phototoxic agent.

74. (New) The method according to claim 71, wherein the cells of the first phenotype are fluorescently labeled.

75. (New) The method according to claim 56, wherein assessing said characteristic in step d comprises measuring cell invasion, adhesion and/or differentiation.

76. (New) The method according to claim 75, wherein the cells of the first phenotype are labeled with a fluorescent membrane linker.

77. (New) The method according to claim 56, wherein the 3-dimensional aggregates are of essentially spherical shape.

78. (New) The method according to claim 56, wherein the 3-dimensional aggregates are formed in the presence of a solid support.

79. (New) The method according to claim 56, wherein the 3-dimensional aggregates are formed in the absence of a solid support.

80. (New) The method according to claim 79, wherein the solid support comprises porous beads.

81. (New) The method according to claim 56, wherein the cells of the first and the second phenotype are labeled with fluorescent labels capable of fluorescing at different wavelengths.

82. (New) The method according to claim 56, wherein the cells of the first and the second phenotype are of human origin.

83. (New) The method according to claim 56, wherein the cells of the second phenotype are normal cells of human origin.

84. (New) The method according to claim 83, wherein the cells of the second phenotype are cells of a tissue in which metastases of the tumour cells are expected to develop.

85. (New) The method according to claim 56, wherein the cells of the second phenotype are endothelial cells.

86. (New) The method according to claim 85, wherein the 3-dimensional cell aggregates are formed from endothelial cells grown on particles of a solid support and tumour cells seeded onto the endothelial cells.

87. (New) The method according to claim 86, wherein the solid support is capable of releasing a blood substitute.

88. (New) The method according to claim 56, wherein the cells of the second phenotype are epithelial cells.

89. (New) The method according to claim 88, wherein the epithelial cells are grown on one side of a porous solid support.

90. (New) The method according to claim 89, wherein the tumour cells are provided in the form of 3-dimensional aggregates applied to the opposite side of the solid support.

91. (New) The method according to claim 56, wherein the cells of the second phenotype

are stromal cells.

92. (New) The method according to claim 91, wherein the tumour cells match the source of the stromal cells.

93. (New) The method according to claim 92, wherein the 3-dimensional cell aggregates are formed from stromal cells grown on particles of a solid support and tumour cells seeded onto the stromal cells.

94. (New) A method of screening for an anti-tumour substance, said method comprising the steps of:

a. providing an in vitro model of a mammalian tissue, said model comprising living mammalian cells of at least two different phenotypes in a predetermined initial proportion, the cells forming 3-dimensional aggregates, each of said aggregates comprising cells of at least a first and a second phenotype, wherein cells of the first phenotype are tumour cells;

b. providing a candidate anti-tumour substance;

c. allowing the cells to proliferate for a predetermined period of time, in the presence and in the absence of the candidate anti-tumour substance;

d. measuring the cell proliferation rate of at least one cell phenotype in the absence and in the presence of the candidate anti-tumour substance; and

e. accepting or rejecting the candidate anti-tumour substance based on results of the measurements of step d.